



## DNA as a unit of life

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### ABSTRACT

*DNA is our memory, the repository of information passed down to us by our ancestors. It was first discovered by a young and unknown doctor from Switzerland - Friedrich Miescher in 1869. Later, in 1953, the English physicist Francis Crick and the American biologist James Watson managed to build a structural model of DNA. So what is a deoxyribonucleic acid molecule? DNA is a macromolecule consisting of two spirally twisted chains that provide storage and transmission of hereditary information. It is this nucleic acid that can be said to define us, our past and our future.*

From the moment of the fusion of the egg with the sperm, a completely new and unique organism with an individual set of genes is formed. If we turn to history, we will find many examples of how closely related marriages have affected people's lives. Such marriages in genetics are called inbreeding. Inbreeding is the crossing of individuals with a close degree of kinship, due to which most of the genes go into a homozygous state.

Such relationships were practiced in ancient Egypt, brothers married sisters, fathers married daughters. This did not occur in one generation, so mutational variability could not manifest itself immediately, after 2 generations, or even later. Historical sources state that such marriages were not uncommon in European royal houses, such as the Habsburg dynasty,

which ruled from the 13th century to the early 20th century in Austria. Due to the large number of closely related marriages, many members of the dynasty had various physical and mental disabilities. Such marriages eventually led to infertility in descendants, which interrupted the dynasty. The Habsburgs married close relatives for many centuries. In 1279, Rudolph became the first king of Germany, during his reign he annexed the vast lands of Austria and took the throne. Rudolf I presented his son Albrecht with a long hooked nose, which in the future will become one of the "visiting cards" of the Habsburg dynasty. New territories were annexed, politically advantageous marriages were concluded, in 1477 an alliance was concluded between Maximilian I and Mary of Burgundy, the daughter of



Charles the Bold, the Austrian dynasty gained enormous influence in Europe. After the death of Mary, Maximilian married the daughter of the Duke of Milan, Bianca, then the emperor married his son Philip I the Handsome to Juan I the Mad, from which, most likely, the descendants of the dynasty. The children of Philip and Juana were in closely related marriages, which fixed various genetic deviations in the dynasty. Also, one of the distinguishing features of the Habsburgs was a very massive lower jaw, devoid of a chin; according to historical sources, this feature has Polish roots. Incest led to the manifestation of various genetic diseases that could have been avoided in conventional marriages, but closely related ties consolidated mutational signs and external changes.

Almost all representatives of the dynasty have a Habsburg nose and jaw. The last emperor, Charles II of Habsburg, was in very poor health; at a fairly late age, Charles began to speak and walk, and suffered from a huge number of diseases. The lower jaw of the monarch was severely deformed, so he had problems with speech and eating, in addition, Charles II showed mental retardation. The apostolic nuncio described the king: "The king is rather short than tall, badly built, ugly; he has a long neck, a long face with a protruding forehead; characteristic Austrian lip; small turquoise-blue eyes, delicate skin. The hair is blond and long combed back so that the ears are visible.

He cannot straighten up and walks leaning against a wall, a table or something else. His body is as weak as his mind. From time to time he gives out signs of intelligence, memory and some liveliness, but not always; usually he looks slow and indifferent, clumsy and lazy, stunned. You

can do anything with it, because it lacks its own will" [2]. In addition to these shortcomings, most likely the emperor had infertility, possibly due to Klinefelter's syndrome, which is also one of the consequences of closely related marriages. In addition, Charles II has an inbreeding percentage of 25%, which is possible as a result of a relationship between brother and sister, instead of 32 ancestors in the fifth generation, the emperor had 10. The thirst for maintaining power and money within the family pushed the Habsburgs to closely related marriages, which killed one of the greatest dynasties in history. Unfortunately, such marriages have not remained a relic of the past, even in the 21st century this is not uncommon, in some countries it is prohibited by law, while in others it is simply not welcomed and condemned by society. In order to trace the mechanism of inheritance and fixation of traits in closely related crosses, a genealogical research method is used, based on the study of pedigrees of people in whose families various anomalies were found. Using this method, the patterns of inheritance of many human traits were established, a large number of mutations, recessive and dominant, were described. Normally, most of the signs in our body are in heterozytic states, which helps block the manifestation of "harmful" signs that can significantly worsen a person's life. Habsburg jaw or mandibular prognathism is a positional relationship of the lower or upper jaw to the base of the skeleton, in which one of the jaws protrudes beyond a given imaginary line in the coronal plane of the skull. This trait is transmitted in an autosomal recessive manner, which implies the expression of the gene through one or possibly several generations. In the case of



the Habsburg dynasty, this trait changed from heterozygous to homozygous. Further inbreeding aggravated the physical and mental condition of the representatives of the dynasty. Almost all had prognathism of the lower jaw, which began to manifest itself in each generation. Unfortunately, there are no reliable historical sources that determine when and in whom this symptom first appeared. In ordinary marriages concluded between people who are not related, provided that one of the parents already has this gene, which is in a heterozygous state, and the other is homozygous for the normal manifestation of the trait, then the offspring will have two types of manifestation of this trait. If the descendants of F<sub>1</sub> marry within the family, then we get: In the second crossing, we observe the law of splitting. The genotype ratio is 1:2:1, and the phenotype ratio is 3:1. You can also observe the appearance of recessive homosity. Normally, with autosomal recessive inheritance of traits, as you know, the gene manifests itself through the generation and mainly in men. Since relations between cousins and sisters, uncles and nieces are possible in incestuous marriages, the recessive gene will appear in each generation, because it will go into a homozygous state, and subsequent crossings will only aggravate the genotype of the offspring. With each such marriage, the percentage of inbreeding increases. As mentioned above, Charles II had an inbreeding percentage of 25. This is possible in the case of a relationship between siblings, but his parents are each other's uncle and niece. This percentage is also explained by the fact that Charles II,

instead of 32 ancestors, which is the norm, had 10. In the journal *Annals Of Human Biology*, a study by scientists from the University of Santiago de Compostela was published, which proves that the "Habsburg jaw" - result of incestuous marriages. In this study, a morphological analysis of the portraits of the Habsburgs, who ruled Spain for about 200 years, was carried out. The study identified familial traits such as mandibular prognathism (MP), also known as "Habsburg" jaw, and maxillary hypoplasia (MD). The tasks of scientists were to identify the percentage of inbreeding and determine whether the Habsburg jaw is the result of closely related marriages.

In this study, the inbreeding coefficient was calculated. The inbreeding coefficient is the probability with which a descendant from a consanguineous marriage at a given locus will have two identical genes obtained from a common ancestor. Due to the huge number of closely related marriages, this coefficient increased, which led to a higher probability of meeting identical genes, due to which various pathological signs may appear, which caused the degeneration of the dynasty. According to the results of the study, it was proved that it was incest that caused the manifestation of the "Habsburg" jaw [3]. Sometimes the desire to preserve power and wealth within the family and the unwillingness to share this with the world pushes people to desperate acts that lead to terrible consequences that cost the fate of entire generations. It was these incestuous marriages that led to the degeneration of one of the most powerful dynasties in history.

## References:

1. Медицинская генетика. Н.Бочков, А. Асанов, Н.Жученко. - Москва: 2014. 132с.



2. <https://www.labirint.ru/books/688859/>
3. <https://obuchalka.org/20180924104012/biologiya-11-klass-gafurov-a-abdukarimov-a-talipova-j-2018.html>
4. <https://adu.by/images/2020/ucheb/biologija-10kl-rus.pdf>